US Ammo resolution

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const { Document, Packer, Paragraph, TextRun, Table, TableRow, TableCell,
      Header, Footer, AlignmentType, HeadingLevel, BorderStyle, WidthType,
      ShadingType, PageNumber, LevelFormat } = require('docx');
const fs = require('fs');

const border = { style: BorderStyle.SINGLE, size: 1, color: "CCCCCC" };
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     style: { paragraph: { indent: { left: 720, hanging: 360 } } } }] },
   { reference: "numbers",
    levels: [{ level: 0, format: LevelFormat.DECIMAL, text: "%1.", alignment: AlignmentType.LEFT,
     style: { paragraph: { indent: { left: 720, hanging: 360 } } } }] },
   { reference: "phase",
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  ]
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      new TextRun({ text: "Enhanced ReSource 2.0 | Concept Paper", italics: true, size: 18, color: "666666" })
     ],
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      })]
    })
  },
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          new TextRun({ text: "Page ", size: 18, color: "666666" }),
          new TextRun({ children: [PageNumber.CURRENT], size: 18, color: "666666" }),
          new TextRun({ text: " | Confidential – For Discussion with DARPA / DoD Stakeholders", size: 18, color: "666666" })
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    new Paragraph({
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    // Executive Summary
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    }),
    new Paragraph({
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      children: [new TextRun("The system simultaneously solves two costly logistics problems for the Department of Defense: the need to ship petroleum, oils, and lubricants (POLs) into contested environments and the burden of managing plastic waste at forward operating bases. At the same time, it creates a commercially viable dual-use technology platform with strong private-sector uptake potential in the multi-billion-dollar PET recycling market.")]
    }),
    new Paragraph({
      spacing: { after: 200 },
      children: [new TextRun({ text: "Key value proposition: ", bold: true }), new TextRun("A force-multiplying logistics capability that is also a profitable,
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self-sustaining technology platform—making it highly attractive for DARPA investment and rapid transition.")]
  }),

  // Problem & Opportunity
  new Paragraph({ heading: HeadingLevel.HEADING_1, children: [new TextRun("2. Problem & Opportunity")] }),
  new Paragraph({ heading: HeadingLevel.HEADING_2, children: [new TextRun("2.1 Military Logistics Pain Points")] }),
  new Paragraph({
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    children: [new TextRun("Deployed forces generate large volumes of mixed plastic waste while remaining dependent on long, vulnerable supply chains for critical consumables such as gun lubricants and other POLs. Traditional waste disposal (burn pits, incineration, or backhaul) creates health, environmental, signature, and cost liabilities. Resupply of lubricants remains a persistent operational constraint.")]
  }),
  new Paragraph({ heading: HeadingLevel.HEADING_2, children: [new TextRun("2.2 Commercial Market Context")] }),
  new Paragraph({
    spacing: { after: 120 },
    children: [new TextRun("The global PET recycling market is already multi-billion USD in scale (estimates ranging from approximately $9–16 billion in 2025, with projected growth toward $20+ billion in the early 2030s). Recent process innovations in enzymatic PET recycling have demonstrated pathways to cost parity or better versus virgin PET (modeled minimum selling prices near $1.51/kg versus ~$1.87/kg for U.S. domestic virgin material). Regulatory recycled-content mandates and brand sustainability commitments further strengthen demand for high-quality recycled monomers and materials.")]
  }),

  // Technical Concept
  new Paragraph({ heading: HeadingLevel.HEADING_1, children: [new TextRun("3. Technical Concept")] }),
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  new Paragraph({ numbering: { reference: "numbers", level: 0 }, children: [new TextRun({ text: "Pre-treatment & Enzymatic Deconstruction: ", bold: true }), new TextRun("Low-energy mechanical size reduction plus surface activation, followed by high-performance PETase/MHETase cascades that achieve >95% deconstruction of PET into mono(2-hydroxyethyl) terephthalate (MHET), terephthalic acid (TPA), and ethylene glycol (EG).")] }),
  new Paragraph({ numbering: { reference: "numbers", level: 0 }, children: [new TextRun({ text: "Biological Reformation: ", bold: true }), new TextRun("Engineered microbial consortia housed in banks of bioreactors convert the intermediate molecules into lubricant base oils, greases, solvents, or single-cell protein biomass.")] }),
  new Paragraph({ numbering: { reference: "numbers", level: 0 }, spacing: { after: 160 }, children: [new TextRun({ text: "Recovery & Purification: ", bold: true }), new TextRun("Automated separation and polishing steps deliver products meeting military specifications or commercial quality standards.")] }),

  new Paragraph({ heading: HeadingLevel.HEADING_2, children: [new TextRun("3.2 Enzyme Engine – State-of-the-Art PETase Variants")] }),
  new Paragraph({
    spacing: { after: 120 },
    children: [new TextRun("The core catalytic advantage comes from deploying the latest engineered bacterial PETase variants:")]
  }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun({ text: "HotPETase ", bold: true }), new TextRun("and related directed-evolution products (T□ ≈ 82.5 °C) capable of operating near the glass-transition temperature of PET.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun({ text: "FAST-PETase ", bold: true }), new TextRun("family and further “locked” or combinatorially improved variants optimized for rapid activity at 50–60 °C.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun({ text: "TurboPETase ", bold: true }), new TextRun("and high-performance cutinase hybrids (e.g., engineered LCC and BhrPETase lineages) that deliver superior rates under high-solids conditions.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, spacing: { after: 160 }, children: [new TextRun("Synergistic PETase–MHETase cascades that relieve product inhibition and drive complete monomer release.")] }),

  new Paragraph({ heading: HeadingLevel.HEADING_2, children: [new TextRun("3.3 System Form Factor & Operational Characteristics")] }),
  new Paragraph({
    spacing: { after: 120 },
    children: [new TextRun("Target configurations range from expeditionary modules to Tricon-compatible (approximately 8 × 6.5 × 8 ft) shipping-container systems. Design goals include low power consumption (dishwasher-scale or better), semi-autonomous operation with minimal user intervention, robustness to mixed waste streams, and continuous or prolonged unattended runs once started.")]
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  }),

  // Performance Targets
  new Paragraph({ heading: HeadingLevel.HEADING_1, children: [new TextRun("4. Performance & Productivity Targets")] }),
  new Paragraph({
    spacing: { after: 120 },
    children: [new TextRun("Ambitious yet grounded targets that exceed original ReSource Phase metrics:")]
  }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("Conversion efficiency: >90–95% mass recovery into usable products.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("Throughput: multi-kilogram to tens of kilograms of waste per day per modular unit, scalable upward.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("Output quality: lubricants meeting or exceeding relevant MIL-PRF specifications; high-purity monomers or protein suitable for further use.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, spacing: { after: 200 }, children: [new TextRun("Operational tempo: near-complete depolymerization of real post-consumer PET in hours to low tens of hours under optimized conditions.")] }),

  // Economic Case
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  new Paragraph({ heading: HeadingLevel.HEADING_2, children: [new TextRun("5.1 Military Cost Avoidance")] }),
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  }),
  new Paragraph({ heading: HeadingLevel.HEADING_2, children: [new TextRun("5.2 Commercial Revenue Pathways")] }),
  new Paragraph({
    spacing: { after: 120 },
    children: [new TextRun("The same core technology supports commercial PET recycling and upcycling. Revenue opportunities include:")]
  }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("Licensing of optimized enzyme variants and process IP to recyclers and chemical companies.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("Sale or lease of modular systems to waste-management operators, remote industrial sites, and disaster-response organizations.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("Sale of recovered monomers, microbial oils, and single-cell protein into established markets, potentially augmented by sustainability premiums and carbon credits.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, spacing: { after: 160 }, children: [new TextRun("Partnerships that leverage regulatory recycled-content mandates and brand commitments.")] }),
  new Paragraph({
    spacing: { after: 200 },
    children: [new TextRun("Because enzymatic processes are approaching or undercutting virgin PET cost structures under optimized conditions, the commercial business case is increasingly robust and can help underwrite continued technology maturation beyond pure government funding.")]
  }),

  // Why DARPA
  new Paragraph({ heading: HeadingLevel.HEADING_1, children: [new TextRun("6. Why DARPA Should Pursue This")] }),
  new Paragraph({
    spacing: { after: 120 },
    children: [new TextRun("Enhanced ReSource 2.0 directly extends the original ReSource vision with the highest-performing PETase variants and process innovations available in 2026. It offers:")]
  }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("Clear, measurable advances in conversion rate, thermostability, autonomy, and product quality.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("Immediate relevance to expeditionary logistics, supply-chain resilience, and Humanitarian Assistance / Disaster Relief operations.")] }),
  new Paragraph({ numbering: { reference: "bullets", level: 0 }, children: [new TextRun("A built-in dual-use pathway that attracts private capital and accelerates transition.")] }),
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    new Paragraph({ numbering: { reference: "bullets", level: 0 }, spacing: { after: 200 }, children: [new TextRun("Alignment with broader DoD priorities around reducing logistical burden and enabling more independent, longer-duration operations.")] }),

    // Roadmap
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    new Paragraph({ numbering: { reference: "phase", level: 0 }, children: [new TextRun({ text: "Phase 1 – Proof of Concept (6–9 months): ", bold: true }), new TextRun("Demonstrate high-yield conversion of real mixed PET waste streams into specification-grade lubricant base oil and/or single-cell protein using the latest PETase cascade in a compact laboratory-to-pilot bioreactor module. Establish baseline techno-economic and SWaP data.")] }),
    new Paragraph({ numbering: { reference: "phase", level: 0 }, children: [new TextRun({ text: "Phase 2 – Integrated System Prototype (12–15 months): ", bold: true }), new TextRun("Build and operate a Tricon-compatible or smaller autonomous unit capable of continuous or semi-continuous operation with multi-output flexibility. Validate performance against DoD-relevant waste compositions and product specifications.")] }),
    new Paragraph({ numbering: { reference: "phase", level: 0 }, spacing: { after: 200 }, children: [new TextRun({ text: "Phase 3 – Field Demonstration & Transition (12–18 months): ", bold: true }), new TextRun("Conduct operationally relevant demonstrations with Service partners. Package IP, process know-how, and commercial partnership strategy to enable rapid transition into both military acquisition pathways and private-sector scale-up.")] }),

    // Closing
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    }),
    new Paragraph({
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      children: [new TextRun("We recommend that DARPA initiate a focused effort to de-risk and prototype this capability, positioning the Department of Defense to own the decisive leap from promising science to fielded logistics advantage and sustainable commercial impact.")]
    }),

    // Contact placeholder
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   ]
  }]
});

Packer.toBuffer(doc).then(buffer => {
  fs.writeFileSync("/home/workdir/artifacts/Enhanced_ReSource_2.0_Concept_Paper.docx", buffer);
  console.log("Document created successfully");
});
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